

ABSTRACT OF THE DISCLOSURE

A time varying electrical excitation(s) is applied to a system containing biologic and/or non-biologic elements, whereupon the time-varying electrochemical or electrical response is detected and analyzed. For biologic specimens, the presence, activity, concentration or relative quantity, and certain inherent characteristics of certain target substances (hereinafter referred to as "target analytes") within, or comprising, the specimen of interest may be determined by measuring either the current response induced by a voltage-mode excitation, or the voltage response induced by a current-mode excitation. Labeling or marker techniques may be employed, whereby electrochemically active auxiliary molecules are attached to the substance to be analyzed, in order to facilitate or enhance the electrochemical or electrical response. The method may also be employed to test non-biologic systems comprising an electrochemical cell or a battery of cells, wherein complex pulse type excitation signals are applied to the cell and the resultant time varying polarization voltage information is extracted and analyzed to determine at least one characteristic of the cell(s) condition or state.